



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of:

Mitsunori SAKAMA

Serial No. 09/070,908

Filed: May 4, 1998

For: FILM FORMING METHOD AND
FILM FORMING APPARATUS

) Group Art Unit: 1762

) Examiner: M. Padgett

) CERTIFICATE OF MAILING

) I hereby certify that this correspondence is being
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2004.

) Adam M. Stanger

REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The *Examiner's Answer* mailed October 7, 2004, has been received and its contents carefully noted. This response is filed within two months of the mailing date of the *Examiner's Answer* and therefore is believed to be timely without extension of time. Accordingly, the Appellants respectfully submit that this response is being timely filed.

The Appellants respectfully submit that the *Examiner's Answer* does not apply the teachings of Kozuka, Gupta '843 and Gupta '796 in a manner which is consistent with their disclosures or in a manner which would have been obvious to one of ordinary skill in the art at the time the present invention was made. Specifically, the *Examiner's Answer* continues to assert that Kozuka, Gupta '843 and Gupta '796 teach or suggest maintenance of pressure (or "flow rate") in a chamber during a transition from a discharge gas to a reactive gas or vice-versa. In particular, it is noted that Kozuka does not teach or suggest maintenance of pressure in a single chamber during a deposition process. The Examiner appears to rely on a teaching of an allegedly stabilized flow rate in a process of Kozuka, which occurs between two chambers. For example, the *Examiner's Answer* and previous communications from the Examiner generally rely on

Embodiment 1, particularly the disclosure at column 5, line 57+, to allegedly teach "keeping the pressure the same for the deposition plasma and H-plasmas" (page 7, *Examiner's Answer*). Rather, column 5, line 53+, of Kozuka appears to teach that a raw material gas 161 and hydrogen gas 162 are introduced at 10 sccm and 40 sccm, respectively, into N-layer forming chamber 103. Then, when the N-layer reaches a predetermined thickness, the introduction of silane gas 161 into the N-layer chamber 103 is terminated, and hydrogen gas 172 is introduced with a flow rate of 40 sccm into an I-layer forming chamber 104. Therefore, it appears that Kozuka teaches an overall flow rate of about 50 sccm in one chamber 103, which is different from an overall flow rate of about 40 sccm in another chamber 104.

Also, as conceded by the Examiner, Kozuka teaches a preference for using a mixture of discharge and reactive gases (page 8, *Examiner's Answer*). The Examiner appears to argue that even if use of single gases in Kozuka is not preferred, that such use in Kozuka may be possible (page 17, *Id.*). However, these arguments are not understood in the context of proving a *prima facie* case of obviousness. It appears that the Examiner is attempting to take the disclosure of a clear preference in Kozuka for a mixed gas (column 4, line 42) and arguing that it would have been obvious to use a raw material gas which is not mixed with a diluting gas simply because such use is possible. It further appears that the Examiner is asserting that the Gupta references "clearly show that either Kozuka's preference or appellants' claimed use of discharge or reactant gases are viable options both expected to be effective in plasma processes analogous to those of Kozuka, and that in either case the gas parameters such as flow rate in (843) are maintained between initial and deposition plasma" (page 17, *Examiner's Answer*). These does not appear to be support in the references for these assertions, these assertions run counter to the teaching in Kozuka and the Gupta references and effectively reverse the burden on the Examiner to factually support any *prima facie* conclusion of obviousness (MPEP § 2142). The burden of factually supporting a *prima facie* case of obviousness is not met by simply holding Gupta, a reference which may teach use of a discharge gas and a reactive gas in isolation, up to Kozuka, which clearly teaches a preference for a mixed gas. Specifically, the Examiner has not provided a teaching in the prior art that shows how or why one of ordinary skill in the art

would have been motivated to modify the process in Kozuka from a process which occurs between two chambers to a process that takes place in a chamber, from a process where an overall flow rate is changed between two chambers to a process where an overall flow rate in a single chamber is maintained during a transition from a discharge gas only to a reactive gas only or vice-versa, and from a process where the discharge gas and reactive gas are mixed to a process where the gases are not mixed.

Further, it is noted that all the independent claims recite that an overall flow rate of gases supplied in a chamber is maintained during a transition from a discharge gas to a reactive gas (or from a reactive gas to a discharge gas). The Appellants respectfully submit that the arguments of record and the *Examiner's Answer* still have not provided arguments which support a *prima facie* case of obviousness. Although Gupta '843 may teach that the rate at which the inert gas or the combined rate at which the inert gas and oxygen or other gas is introduced during step 215 is substantially equal to the rate at which the process gas is introduced in step 230 (column 5, lines 45-49), it appears that Gupta '843 fails to teach or suggest that a transition is important, any of the particulars of the transition, that the transition should occur in a manner which maintains the overall flow rate, or what specifically happens during a transition from a discharge gas to a reactive gas (or from a reactive gas to a discharge gas). Gupta '796 and Kozuka do not cure the deficiencies in Gupta '843.

Although Gupta '796 may teach that the flow of inert gas to the reaction chamber may be stopped and the desired reactant gas is introduced into the chamber (column 5, lines 40-42), it appears that Gupta '796 also fails to teach or suggest that a transition is important, any of the particulars of the transition, that the transition should occur in a manner which maintains the overall flow rate, or what specifically happens during a transition from a discharge gas to a reactive gas (or from a reactive gas to a discharge gas).

Kozuka may teach when the N-layer reaches a predetermined thickness, the introduction of silane gas 161 into the N-layer chamber 103 is terminated, and hydrogen gas 172 is introduced with a flow rate of 40 sccm into the I-layer forming chamber 104 whereby the pressure therein was made the same as that of the N-layer forming chamber 103. This appears to show that the pressure of the I-layer forming

chamber 104 and the N-layer forming chamber 103 are made the same as each other, but this simply does not teach or suggest that the overall rate of gases supplied in said chamber (or in one chamber) is maintained during a transition from a discharge gas to a reactive gas (or from a reactive gas to a discharge gas).

In other words, all three references, which are apparently relied upon in some hypothetical combination to allegedly teach that an overall flow rate of gases supplied in a chamber is maintained during a transition from a discharge gas to a reactive gas (or from a reactive gas to a discharge gas), either alone or in combination, do not teach or suggest that a transition is important, any of the particulars of the transition, that the transition should occur in a manner which maintains the overall flow rate, or what specifically happens during a transition from a discharge gas to a reactive gas (or from a reactive gas to a discharge gas).

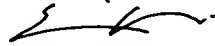
Therefore, the Appellants respectfully submit that it would not have been obvious to one of ordinary skill in the art at the time the present invention was made to modify Kozuka, Gupta '843 and Gupta '796, either alone or in combination, so as to achieve a process where an overall flow rate of gases supplied in a chamber is maintained during a transition from a discharge gas to a reactive gas or vice-versa.

In the present application, it is respectfully submitted that the prior art of record, alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

For the reasons stated above, the Official Action has not formed a *proper prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

The present application is believed to be in condition for allowance and favorable reconsideration is respectfully requested. If the Examiner feels further discussions would expedite prosecution of this application, he is invited to contact the undersigned.

Respectfully submitted,



Eric J. Robinson
Registration No. 38,285

Robinson Intellectual Property Law Office, P.C.
PMB 955
21010 Southbank Street
Potomac Falls, VA 20165
(571) 434-6789
(571) 434-9499 (facsimile)